

**REMARKS**

Claims 1, 3-7 and 9-13 are pending in this application. By this Amendment, claims 1, 3, 4, 6, 7, 9, 10 and 12 are amended, new claim 13 is added, and claims 2 and 8 are canceled without prejudice to or disclaimer of the subject matter set forth therein. Support for the amendments to claims 1, 3, 4, 6, 7, 9, 10 and 12 can be found in the specification as originally filed, for example, at page 2, lines 23-26; page 2, line 31 – page 3, line 2; page 3, lines 15-17; page 4, lines 22-27; page 5, lines 1-4; page 6, lines 12-16, and FIG.2; and in claims 1-4, 6-10 and 12 originally filed. Support for new claim 13 can be found in the specification as originally filed, for example, at page 4, lines 28-31. Thus, no new matter is added.

**I. Rejections Under 35 U.S.C. §112****A. First Paragraph**

The Office Action rejects claims 1-12 under 35 U.S.C. §112, first paragraph, as lacking enablement. Applicant respectfully traverses this rejection. While Applicant does not necessarily agree with this rejection, Applicant respectfully submits that the amended claims clearly comply with the enablement requirements under §112. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

**B. Second Paragraph**

The Office Action rejects claims 1-12 under 35 U.S.C. §112, second paragraph, as failing to particularly point out and distinctly claim the subject matter that Applicant regards as the invention. While Applicant does not necessarily agree with these rejections, Applicant respectfully submits that the claims have been amended to more clearly set forth the subject matter therein. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

## **II. Rejections Under 35 U.S.C. §102**

The Office Action rejects claims 1 and 7 under 35 U.S.C. §102(b) over U.S. Patent No. 4, 791,061 to Sumino et al. Applicant respectfully traverses this rejection.

Sumino discloses a method of immobilizing microorganisms by entrapment in a polymeric substance formed of monomer or prepolymer. *See* Sumino, col. 3, lines 1-5. In particular, Sumino discloses adding microorganism-containing activated sludge to a prepolymer or monomer and polymerizing the prepolymer or monomer to entrap the activated sludge. *See* Sumino, col. 3, line 47 – col. 4, line 9. Sumino also discloses preventing the temperature of the solution to rise during polymerization, by maintaining the temperature of the solution at 20°C to about 35°C. *See* Sumino, col. 6, line 66 – col. 7, line 2.

However, Sumino does not disclose all of the elements of independent claim 1, which sets forth, in pertinent part, a “method for manufacturing a heated support, comprising subjecting an immobilized microorganism support, in which activated sludge is immobilized inside of the support by entrapment, to heat treatment, wherein the heat treatment is conducted at a temperature of not less than 40°C and not more than 130°C.”

Sumino does not disclose subjecting an immobilized microorganism support, in which microorganisms from activated sludge have been immobilized, to a heat treatment at temperatures in the range of 40°C to 130°C. Rather, Sumino discloses the use of heat in a temperature range of 20°C to about 35°C, below the range of the heat treatment set forth in claim 1, as part of a polymerization process to prepare a microorganism support. *See* Sumino, col. 6, line 66 – col. 7, line 2. Thus, Sumino does not disclose, in discrete embodiments, the method of claim 1.

Sumino also does not disclose, in discrete embodiments, all of the elements of independent claim 7, which sets forth, in pertinent part, a “method for manufacturing a heated support, comprising polymerizing at least one of monomers and prepolymers that are

immobilizing materials for supporting microorganisms in the presence of activated sludge while carrying out heat treatment, wherein the heat treatment is conducted at a temperature of not less than 60°C and not more than 130°C.”

As discussed above, Sumino discloses adding microorganism-containing activated sludge to a prepolymer or monomer and polymerizing the prepolymer or monomer to entrap the activated sludge, while maintaining the temperature of the solution at 20°C to about 35°C. *See* Sumino, col. 3, line 47 – col. 4, line 9; col. 6, line 66 – col. 7, line 2. However, Sumino does not disclose heating the polymerization solution to a temperature above 35°C to conduct a heat treatment during polymerization. Thus, Sumino does not disclose, in discrete embodiments, all of the elements of independent claim 7.

For at least the above reasons, Applicant respectfully submits that claims 1 and 7 are patentable over Sumino. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

### **III. Rejections Under 35 U.S.C. §103**

The Office Action rejects claims 2-6 and 8-12 under 35 U.S.C. §103(a) over U.S. Patent No. 4, 791,061 to Sumino et al. Applicant respectfully traverses this rejection.

Claims 1 and 7 are as set forth above. Claims 2 and 8 have been canceled by this amendment, and Applicant respectfully submits that the rejection of these claims is therefore moot. Claims 3-6 and 9-12 depend from claims 1 and 7, respectively, and include all of the limitations thereof.

As discussed above, Sumino does not disclose, nor does it suggest, subjecting an immobilized microorganism support, in which microorganisms from activated sludge have been immobilized, to a heat treatment at temperatures in the range of 40°C to 130°C, as set forth in claim 1. Rather, Sumino discloses a method of immobilizing microorganisms by

entrapment in a polymeric substance formed of monomer or prepolymer. *See* Sumino, col. 3, lines 1-5. Thus, Sumino does not disclose or suggest the subject matter of claim 1.

Further, Sumino discloses maintaining the temperature of a polymerization solution for forming an immobilized microorganism support in the range of 20°C to about 35°C. *See* Sumino, col. 6, line 66 – col. 7, line 2. Sumino teaches that “it is necessary for the water solution 8 of the polymerization mixture to prevent temperature rise due to the heat at the time of polymerization, and the water solution 8 is held at 20°~35°C by use of a water jacket 11.” *Id.* That is, Sumino teaches away from heat treatments of immobilized microorganism support, in which microorganisms from activated sludge have been immobilized, at temperatures ranging from 40°C to 130°C, as set forth in independent claim 1, at least because Sumino teaches that elevated temperatures, temperatures above 35°C, should be prevented.

In addition, Sumino does not disclose or suggest methods for manufacturing heated supports, in which monomer and/or prepolymer immobilizing materials are polymerized in the presence of activated sludge during a heat treatment conducted at a temperature in the range of 60°C to 130°C, as set forth in independent claim 7. As discussed above, Sumino discloses adding microorganism-containing activated sludge to a prepolymer or monomer and polymerizing the prepolymer or monomer to entrap the activated sludge, while maintaining the temperature of the solution at 20°C to about 35°C. *See* Sumino, col. 3, line 47 – col. 4, line 9; col. 6, line 66 – col. 7, line 2. That is, Sumino stresses the importance of not allowing the temperature to rise during polymerization.

Because Sumino teaches that elevated temperatures should be avoided during polymerization, and specifically teaches maintaining the temperature of the polymerization mixture at in the range of 20°C to about 35°C, Sumino actually teaches away from allowing

the temperature during polymerization to rise higher than 35°C. In particular, Sumino does not teach allowing the temperature during polymerization to rise as high as 60°C or more. Thus, Sumino does not teach or suggest the subject matter of independent claim 7.

For at least the reasons set forth above, Applicant respectfully submits that independent claims 1 and 7 are patentable over Sumino, and that their respective dependent claims are likewise patentable over Sumino. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

#### **IV. New Claim 13**

By this amendment, new claim 13, which depends from claim 1 and includes all of the limitations thereof, is added. For at least the same reasons discussed above with respect to claim 1, Applicant respectfully submits that claim 13 is patentable over the cited art.

#### **V. Conclusion**

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-12 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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